

**VPDES PERMIT PROGRAM MUNICIPAL MINOR PERMIT
FACT SHEET**

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9VAC 25-260-00 et seq. The discharge results from the operation of a septic tank, dosing tank, rotary sand filter sewage treatment plant, tablet chlorinator and chlorine contact tank, tablet dechlorinator, and cascade post aeration. This permit action consists of limiting BOD, total suspended solids, total residual chlorine, dissolved oxygen, bacteria, pH, and includes other requirements and special conditions. SIC Code: 4952

1. Facility Name and Address:

Hurley High School STP
Route 1, Box 249
Hurley, VA 24620

Buchanan County Public Schools
P.O. Box 833
Grundy, VA 24614

Location: St. Rt. 643, 0.5 mile south of the intersection of St Rts. 643 and 652

2. Permit No.: VA0026972 Expiration Date: July 10, 2012

3. Owner Contact: Tommy P. Justus
Title: Division Superintendent
Telephone No.: (276)935-4551

4. Application Complete Date: December 29, 2012
Permit Drafted By: Clairise R. Shaheen Date: April 9, 2012
DEQ Regional Office: Southwest Regional Office
Reviewed By: Steve E. Anty Date 4/26/2012
Date _____
Public Comment Period Dates: from _____ to _____

5. Receiving Waters Classification:

Receiving Stream: Right Fork River Mile: 6ARIF000.27
Basin: Tenn-Big Sandy River
Subbasin: Big Sandy River
Section: 3 Class: IV
Special Standards: None
1-Day, 10-Year Low Flow: 0.019 MGD High Flow: 0.105 MGD
7-Day, 10-Year Low Flow: 0.026 MGD High Flow: 0.170 MGD
30-Day, 10-Year Low Flow: 0.334 MGD High Flow: 2.302 MGD
30-Day, 5-Year Low Flow: 0.063 MGD
Harmonic Mean: 0.419 MGD
High Flow Months January thru May
Tidal: No On 303D List: Yes

See Attachment No. 1 – Flow Frequency Analysis and Mixing Zone Predictions

6. Licensed Operator Requirements: None.

7. Reliability Class: III

8. Permit Characterization:

() Private () Federal (X) State (X) POTW () PVOTW
 () Possible Interstate Effect () Interim Limits in Other Document

9. Treatment Provided: The treatment facilities consist of a septic tank, dosing tank, rotary sand filter sewage treatment plant, tablet chlorinator and chlorine contact tank, tablet dechlorinator, and cascade post aeration.

Discharge Description

OUTFALL NUMBER	DISCHARGE SOURCE (1)	TREATMENT (2)	FLOW (3)
001	Sewage Treatment Plant	Septic tank, dosing tank, rotary sand filter, tablet chlorinator and chlorine contact tank, tablet dechlorination facilities, and cascade post aeration facilities.	0.008 MGD

(1) Operations contributing to the flow (2) Treatment Units (3) Design Flow for Municipal Plant

10. Sewage Sludge Use or Disposal:

The septic tank sludge is pumped and hauled to the Town of Richlands Wastewater Treatment Plant, and the Conoway Wastewater Treatment Plant as needed, for additional treatment and final disposal.

Sludge Hauler: Septic Inc., Haysi, VA

11. Discharge Location Description:

The facility is located on St. Rt. 643, 0.5 miles from the intersection of St. Rts. 643 & 652, in Buchanan County, Virginia.

Name of Topo: Hurley, VA and Panther, WV Quadrangle No.: 118A
 Latitude/Longitude: 37°22'51" 82°00'01"

See Attachment 2

12. Materials Storage: Materials stored on site include chlorine tablets for disinfection, and sodium sulfate tablets for dechlorination.

13. Ambient Water Quality Information:

The DEQ maintained an ambient station at river mile 17.71 on Knox Creek. Benthic samples and fecal coliform violations indicated Knox Creek to be impaired and resulted in an impairment listing. Therefore, Knox Creek is designated as not supporting aquatic life use and not supporting recreational use. The Virginia Department of Health has issued a fish consumption advisory for Knox Creek from the Virginia/Kentucky state line upstream to its headwaters near the Virginia/West Virginia state line, including all tributaries, due to PCB contamination. A TMDL for benthic and bacteria was developed and approved by EPA for Knox Creek July 11, 2006, and did not address the PCBs; PCBs will be addressed at

a later date.

14. Antidegradation Review and Comments: Tier 1 _X_ Tier 2 ___ Tier 3 ___

The State Water Control Board's Water Quality Standards includes an antidegradation policy (6 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. Due to the impairments, Straight Fork is considered to be a Tier 1 stream. The application for reissuance proposes no new or increased discharges of pollutants, and proposes no new sources of wastewater. Therefore, further anti-degradation review is not required.

15. Site Inspection:

Date: 04/21/2010 Performed By: Danny M. Petty
 Environmental Inspector
 DEQ-SWRO

16. Effluent Screening and Limitation Development:

() Interim Limitations Design Flow: 0.008 MGD Effective Dates - From: 07/11/12
 (X) Final Limitations To: 07/10/17

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (mgd)	NA	NL	NA	NA	NL	1/Day	Estimate ¹
BOD ₅	1,4	24 mg/l 0.73 kg/d	36 mg/l 1.1 kg/d	NA	NA	1/Month	Grab
Total Suspended Solids	1	30 mg/l 0.91 kg/d	45 mg/l 1.4 kg/d	NA	NA	1/Month	Grab
Chlorine ²	3	0.032 mg/l	0.038 mg/l	NA	NA	1/Day	Grab
E. Coli ³	3	126 N/100m	NA	NA	NA	1/Year ⁴	Grab

pH (std units)	3	NA	NA	6.0 std. Units	9.0 std. Units	1/Day	Grab
Dissolved Oxygen	3	NA	NA	5.0 mg/l	NA	1/Day	Grab

NA = Not Applicable
 NL = No Limitations

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Engineering Judgement
3. Water Quality Standard
4. Other (model, WQM Plan, etc)
5. Best Professional Judgement

- ¹ Estimated average daily flowrate shall be based on the most accurate method or device available such as: weir, potable water meter, pump rates, etc.
- ² Additional monitoring requirements for Total Residual Chlorine (TRC):
 - (a) TRC shall be monitored at the outlet of the chlorine contact tank and prior to dechlorination at a frequency of **once per day** by grab sample.
 - (b) No more than **3** samples for TRC taken after the chlorine contact tank and prior to dechlorination shall be less than **1.0 mg/l** for any calendar month.
 - (c) **No** TRC collected prior to dechlorination shall be less than **0.60 mg/l**.
- ³ Samples for E. coli are to be collected between the hours of 10:00 a.m. and 4:00 p.m.
- ⁴ Four E. coli samples are to be collected in the month of October for each year of the permit. Samples should be taken at least seven days apart within the calendar month of October. The results are to be calculated and reported as a Geometric Mean.

On January 15, 2003, new bacteria standards in 9 VAC 25-260-170.A became effective, as did the revised disinfection policy of 9 VAC 25-260-170.B. These standards replaced the existing fecal coliform standard and disinfection policy of 9 VAC 25-160-170. In short, E.coli criteria replaced the existing fecal coliform criteria for freshwater.

In accordance with the agency guidance for the new criteria, permittees, which use chlorine, could perform a study to demonstrate that chlorine limits can be used as a surrogate for bacteria limits in a permit for an individual discharge. Twelve (12) data points are considered as the minimum acceptable data set. Demonstration that chlorine is an adequate surrogate is considered satisfied if there are no exceedences of the applicable criterion in the demonstration data set while the discharge is in compliance with the permitted chlorine limits at the facility. However, for major permits and minors with an EPA approved TMDL that has a wasteload allocation for bacteria for that facility, chlorine demonstrations are not allowed. Although chlorine residual is still considered the primary assurance of adequate disinfection, bacteria limits must be included in these permits. *Therefore, annual E.coli monitoring during the month of October, with a minimum of four weekly samples, is proposed for the term of the permit.* Water Quality Standards 9VAC25-260-170 allows for geometric means to be calculated using all data collected during any calendar month with a minimum of four weekly samples, collected at least 7 days apart between the hours of 10:00 a.m. and 4:00 p.m. E. coli bacteria shall not exceed a monthly geometric mean of 126 CFU/100 ml in freshwater.

New flow data allowed for the reevaluation of ammonia and chlorine limits.

NH₃-N limits are derived from the ammonia tables or formulas in the 9 VAC 25 260 *Water Quality Standards*. August 27, 2003 the State Water Control Board adopted new criteria for ammonia nitrogen. Under 9VAC 25 260 155, the new criteria is less restrictive than the previous criteria. The acute ammonia nitrogen standard for freshwater only considers instream pH and utilizes the 1Q10 instream flow value for calculating steady state wasteload allocations. Chronic ammonia criteria can be based on total ammonia nitrogen (mg/l) in freshwater where the early life stages of fish are present or absent, and vary with instream temperature and pH values. Steady state wasteload allocations are calculated utilizing the 30Q10. Human Health standards are not applicable for ammonia nitrogen. Utilizing the new criteria with the updated flow information, the calculated wasteload allocations were higher and therefore, limits are no longer required for this discharge.

See Attachment No. 3 for chlorine calculations and Attachment 4 for ammonia calculations.

17. Basis for Sludge Use and Disposal Requirements:

The VPDES Permit Regulation (9 VAC 25-31-10 et seq.), adopted by the SWCB May 22, 1996, became effective on July 24, 1996. The newly adopted regulation incorporated technical standards for the use or disposal of sewage sludge, specifically land application and surface disposal, promulgated under 40 CFR Part 503.

18. Antibacksliding Statement:

Removal of ammonia limits was based on new information and new criteria in which to evaluate them by; therefore, the permit is in compliance with antibacksliding provisions of the Permit Regulation, 9 VAC 25-31-220.1.

19. Part I.B. Special Conditions:

- A. Additional Chlorine Limitations and Monitoring Requirements (I.B.1)
Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790; 9VAC25-260-170 Bacteria standards; also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.
- B. 95% Capacity Reopener (I.B.2)
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 2 for all POTW and PVOTW permits.
- C. Indirect Dischargers (I.B.3)
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.
- D. CTC, CTO Requirement (I.B.4)
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790.
- E. O & M Manual Requirements (I.B.5)
Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9VAC25-31-190 E.
- F. Licensed Operator Requirement
Rationale: The VPDES Permit Regulation, 9VAC25-31-200 D and the Code of Virginia § 54.1-

2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.), require licensure of operators. A licensed operator is not required at this facility therefore, this condition will not be included in the permit.

- G. Reliability Class (I.B.6)
Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC25-790 for all municipal facilities.
- H. Treatment Works Closure Plan (I.B.7)
Rationale: State Water Control Law §62.1-44.15:1.1 makes it illegal for an owner to cease operation and fail to implement a closure plan when failure to implement the plan would result in harm to human health or the environment. This condition is used to notify the owner of the need for a closure plan where a treatment works is being replaced or is expected to close.
- I. Sludge Reopener (I.B.8)
Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C 4 for all permits issued to treatment works treating domestic sewage.
- J. Compliance Reporting Under Part I A (I.B.9)
Rationale: Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.
- K. Section 303(d) List (TMDL) Reopener (I.B.10)
Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
- L. Sludge Use and Disposal (I.B.11)
Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B2; and 420 through 720, and 40CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the Department of Health's Biosolids Use Regulations, 12 VAC 5-585-10 et seq.
- M. Condition that the permit shall be terminated when regional sewerage service is made available
Rationale: DEQ strategy to minimize individual discharges and promote regionalization of wastewater treatment. (I.B.12)
- N. Part II, Conditions Applicable to All Permits
Rationale: VPDES Permit Regulation, 9VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

20. Changes to Permit:

Ammonia limits were removed from the permit.

Chlorine limits were reevaluated and new limits were included.

The Special Condition, *Monitoring Requirements*, was removed from the permit. See *Item 23, Additional Comments*, for further explanation on removing this condition.

All effluent limits have been written using two significant figures in accordance with Guidance Memo 03-2008.

21. Variances/Alternate Limits or Conditions:

A waiver from testing for temperature and fecal coliform was granted since the existing permit for Hurley High School does not require it.

22. Public Notice Information required by 9VAC 25-31-280 B:

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Clairise R. Shaheen at:

Virginia Department of Environmental Quality
Southwest Regional Office
355-A Deadmore Street
Abingdon, VA 24210
Telephone No. (276) 676-4800
Email: clairise.shaheen@deq.virginia.gov

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Southwest Regional Office By appointment.

23. Additional Comments:

Reduced Monitoring: The facility was evaluated for and was granted reduced monitoring in the previous reissuance. In June, 2008, the facility had a BOD₅ violation and should have been required to resume monthly testing based on the criteria set forth in Guidance Memorandum #98-2005, Reduced Monitoring. In addition, the facility has an intermittent discharge since school is not in session during the summer months, and therefore, in accordance with the guidance, does not qualify for reduced monitoring. Monthly monitoring of BOD₅ and total suspended solids will be reinstated with the effective date of the permit.

24. TMDL

Hurley High School discharges into the Right Fork, Knox Creek. Currently, Knox Creek is on the 303(d) list for fecal coliform violations and benthic impairment. The *2002 303(d) Report on Impaired Waters* designated a 16.94 mile stretch of Knox Creek as impaired. A TMDL was developed and approved by EPA for Knox Creek March 27, 2007. In addition to fecal coliform violations and benthic impairment, Knox Creek was listed for PCBs. The Virginia Department of Health has issued a fish consumption advisory for Knox Creek from the Virginia/Kentucky state line upstream to its headwaters near the Virginia/West Virginia state line, and included all tributaries due to the PCB contamination. The TMDL that was developed and approved by EPA for Knox Creek March 27, 2007 did not address the PCBs; PCBs will be addressed at a later date.

Potential sources for the fecal coliform impairment include both point and nonpoint source contributions. Livestock, residential runoff, failed or malfunctioning septic systems, and currently permitted discharges surround the stream banks. The benthic impairment is largely attributed to total dissolved solids. Possible sources of the benthic impairment are nonpoint sources such as abandoned mine land, urban areas, and land currently being mined.

Although Hurley High School discharges to a tributary of Knox Creek its limits, conditions, and monitoring requirements included in the permit must be considered to protect Knox Creek from any impairment as a result of the discharge from the wastewater treatment plant. A TMDL reopener condition is contained in the permit, should modification become necessary, and E. Coli monitoring has been added to the permit.

The TMDL for this discharge provides the following average annual E.coli loads (cfu/year) modeled after allocation in the Knox Creek watershed at the outlet:

Impairment	Receiving Stream	River Mile Location Hurley Middle School	Maximum Flow Gallon Per Day	WLA (cfu/year)	LA (cfu/year)	TMDL (cfu/year)
Knox Creek	N/A			4.53E+10	1.74E+13	1.75E+13
VA0026972	Right Fork of Knox Creek	6ARIF000.27	0.008 MGD	1.39E+10		

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION

Water Quality Assessments and Planning

629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
Hurley High School STP - #VA0026972

TO: Charles Gates, SWRO

FROM: Paul Herman, WQAP

DATE: January 6, 1997

COPIES: Ron Gregory, Charles Martin, Eugene Powell, File

The Hurley High School STP discharges to the Straight Fork near Blackey, VA. Stream flow frequencies are required at this site by the permit writer for the purpose of calculating effluent limitations for the VPDES permit.

The VDEQ conducted several flow measurements on the Right Fork below Straight Fork since 1994. The measurements were made near the mouth at Blackey, VA. The measurements made by the VDEQ correlated very well with the same day daily mean values from the continuous record gage on the Levisa Fork at Big Rock, VA #03207800. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gage were plotted on the regression line and the associated flow frequencies at the measurement site were determined from the graph.

The flow frequencies at the discharge point were determined by using the values at the measurement site and adjusting them by proportional drainage areas. The data for the reference gage, the measurement site and the discharge point are presented below:

Levisa Fork at Big Rock, VA (#03207800):

Drainage Area = 297 mi ²	
1Q10 = 9.5 cfs	High Flow 1Q10 = 21 cfs
7Q10 = 12 cfs	High Flow 7Q10 = 32 cfs
30Q5 = 23 cfs	HM = 86 cfs

Right Fork below Straight Fork, (#02026400):

Drainage Area = 8.53 mi²
1Q10 = 0.026 cfs High Flow 1Q10 = 0.083 cfs
7Q10 = 0.037 cfs High Flow 7Q10 = 0.15 cfs
30Q5 = 0.093 cfs HM = 0.62 cfs

The high flow months are December through May.

Straight Fork at discharge point:

Drainage Area = 1.55 mi²
1Q10 = 0.005 cfs High Flow 1Q10 = 0.015 cfs
7Q10 = 0.007 cfs High Flow 7Q10 = 0.027 cfs
30Q5 = 0.017 cfs HM = 0.113 cfs

This analysis assumes there are no significant discharges, withdrawals or springs influencing the flow in the Straight Fork upstream of the discharge point.

If there are any questions concerning this analysis, please let me know.

In evaluating the discharge limits for Hurley High School, it was discovered that the actual discharge location for the High School is to Right Fork of Knox Creek, upstream of the Hurley Middle School. In addition, flow frequencies were updated based on more current data. Flow frequencies used for evaluating limits are as follows:

The data for the reference gage are as follows:

Levisa Fork at Big Rock, VA (#03207800):

Drainage Area = 297 mi²

1Q10 = 11 cfs	High Flow 1Q10 = 41 cfs
7Q10 = 13 cfs	High Flow 7Q10 = 56 cfs
30Q10 = 18 cfs	High Flow 30Q10 = 124 cfs
30Q5 = 24 cfs	HM = 90 cfs

Therefore, updated flows for Right Fork below Straight Fork, (#02026400):

Drainage Area = 8.53 mi²

1Q10 = 0.0301 cfs, 0.019 MGD	High Flow 1Q10 = 0.1620 cfs, 0.105 MGD
7Q10 = 0.0401 cfs, 0.026 MGD	High Flow 7Q10 = 0.2625 cfs, 0.17 MGD
30Q10 = 0.517 cfs, 0.334 MGD	High Flow 30Q10 = 3.5613 cfs, 2.302 MGD
30Q5 = 0.0970 cfs, 0.063 MGD	HM = 0.6488 cfs, 0.419 MGD

The high flow months are currently January through May.

Mixing Zone Predictions for Hurley High School STP – Low Flow Conditions

Effluent Flow = 0.008 MGD
Stream 7Q10 = .026 MGD
Stream 30Q10 = .334 MGD
Stream 1Q10 = .019 MGD
Stream slope = .02 ft/ft
Stream width = 9 ft
Bottom scale = 5
Channel scale = 3

Mixing Zone Predictions @ 7Q10

Depth = .0403 ft
Length = 361.06 ft
Velocity = .1449 ft/sec
Residence Time = .0288 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1629 ft
Length = 110.89 ft
Velocity = .3611 ft/sec
Residence Time = .0036 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0351 ft
Length = 405.65 ft
Velocity = .1322 ft/sec
Residence Time = .8521 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Mixing Zone Predictions for Hurley High School STP – High Flow Conditions

Effluent Flow = 0.008 MGD
Stream 7Q10 = .17 MGD
Stream 30Q10 = 2.302 MGD
Stream 1Q10 = .105 MGD
Stream slope = .02 ft/ft
Stream width = 9 ft
Bottom scale = 5
Channel scale = 3

Mixing Zone Predictions @ 7Q10

Depth = .1096 ft
Length = 155.43 ft
Velocity = .2793 ft/sec
Residence Time = .0064 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .5282 ft
Length = 39.56 ft
Velocity = .7522 ft/sec
Residence Time = .0006 days

Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0832 ft
Length = 196.22 ft
Velocity = .2335 ft/sec
Residence Time = .2335 hours

Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

ATTACHMENT 2

VPDES Permit No

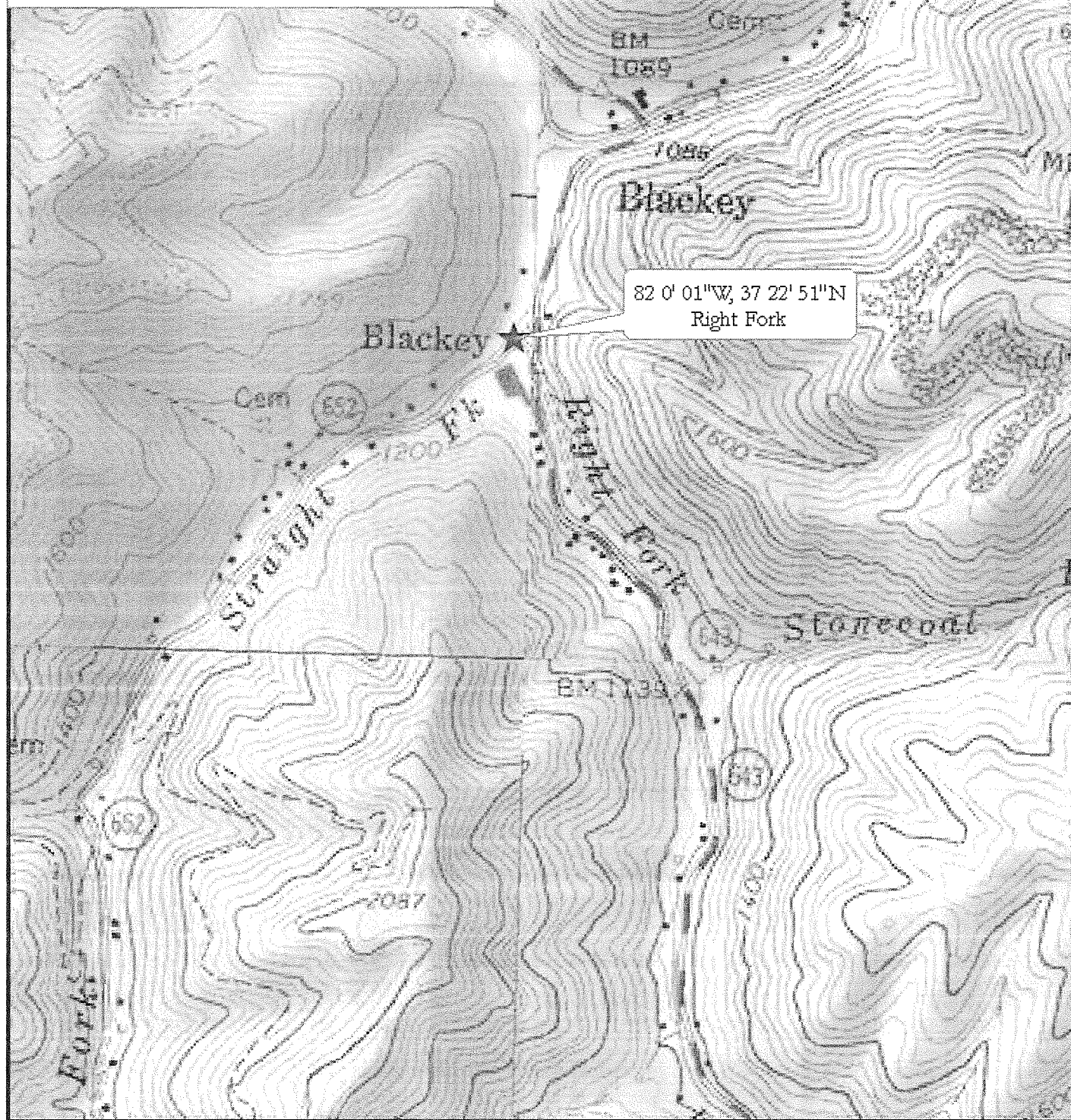
VA0026972

Hurley High School STP
Right Fork Discharge Point



0 0.25 0.5 Miles

Data Sources: National Geographic USGS 1:24K Quad Map:
Hurley and Panther, VA Quadrangle



Chlorine Analysis for Hurley High School STP

Background:

In order to bring chlorine into consistency with the standards for all other toxics materials, the old standard was revoked and chlorine was included in 9 VAC 25-260-140.B, which became effective on 12/10/97. On January 15, 2003, new bacteria standards in the Water Quality Standards Section 9 VAC 25-260-170.A became effective, as did the revised disinfection policy of 9 VAC 25-260-170.B. In short, E.coli criteria replaced the existing fecal coliform criteria for freshwater. The agency intends to allow the continued use of chlorine as a surrogate parameter for evaluation of compliance with the bacteria standards.

Standards:

$$A = \text{Acute} = 0.019 \text{ mg/l} \quad C = \text{Chronic} = 0.011 \text{ mg/l}$$

Wasteload Allocations:

The wasteload allocations (WLA) are calculated as follows, assuming a background concentration of 0:

$$Q_e = \text{Design Flow of STP} = 0.008 \text{ MGD}$$

$$Q_{s-1} = 1\text{Q10 Low Flow} = 0.019 \text{ MGD (June-Nov)} \quad Q_{s-7d} = 7\text{Q10 Flow} = 0.026 \text{ MGD (June-Nov)}$$

$$f = \text{decimal fraction of flow to use} \\ = 1.0 \text{ (complete mix for 1Q10 and 7Q10)}$$

$$WLA_{\text{Acute}} = \frac{\{A[Q_{s-1}(f) + Q_e] - Q_{s-1}(\text{background})\}}{Q_e}$$

$$WLA_{\text{chronic}} = \frac{\{C[Q_{s-7}(f) + Q_e] - Q_{s-7}(\text{background})\}}{Q_e}$$

$$WLA_{\text{Acute}} = \frac{0.019 (0.019(1.0) + 0.008) - 0}{0.008} = 0.064 \text{ mg/l}$$

$$WLA_{\text{chronic}} = \frac{0.011 (0.026(1.0) + 0.008) - 0}{0.008} = 0.047 \text{ mg/l}$$

Permit Limits:

The above WLA's were entered in the *Virginia DEQ: Statistically Derived Permit Limits Version 2.0.4* with the following results: (program output provided pgs 3-5 of this attachment)

Monthly Average Limit: **0.032 mg/l**

Weekly Average Limit: **0.038 mg/l**

Additionally, no more than **3** samples for TRC shall be less than **1.0 mg/l** for any one calendar month and no TRC sample shall be less than **0.60 mg/l**.

Chlorine Analysis for Hurley High School STP (continued)

Limit Derivation from *Statistically Derived Permit Limits Version 2.0.4*:

Chemical = Chlorine
Chronic averaging period = 4
 $WLA_a = 0.064$
 $WLA_c = 0.047$
 $Q.L. = 0.1$
samples/mo = 30
samples/wk = 8

Summary of Statistics:

observations = 1
Expected Value = 5
Variance = 9
C.V. = 0.6
97th percentile daily values = 12.1670
97th percentile 4 day average = 8.31895
97th percentile 30 day average = 6.03026
< Q.L. = 0
Model used BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 0.064
Average Weekly Limit = 3.81763254977422E-02
Average Monthly Limit = 3.17197544875314E-02

The data are: 5

Ammonia-Nitrogen Analysis for Hurley High School STP

Background:

NH₃-N limits are derived from the ammonia tables or formulas in the 9 VAC 25 260 *Water Quality Standards*. August 27, 2003 the State Water Control Board adopted new criteria for ammonia nitrogen. Under 9VAC 25 260 155, the new criteria is less restrictive than the previous criteria. The acute ammonia nitrogen standard for freshwater only considers instream pH and utilizes the 1Q10 instream flow value for calculating steady state wasteload allocations. Chronic ammonia criteria can be based on total ammonia nitrogen (mg/l) in freshwater where the early life stages of fish are present or absent, and vary with instream temperature and pH values. Steady state wasteload allocations are calculated utilizing the 30Q10. Human Health standards are not applicable for ammonia nitrogen.

Standards:

Ammonia standards were calculated for a dry season and wet season and assume early life stages of fish are present for chronic criteria values.

Dry Season (June-Nov) pH = 8.0

Wet Season (Dec-May) pH = 8.0

Dry Season (June-Nov) Temperature = 25°

Wet Season (Dec-May) Temperature = 15°

The ammonia-nitrogen water quality standards (WQS) based on tables from 9VAC 25-260-155 are as follows:

Acute_{dry} = 8.4 mg/l

Acute_{wet} = 8.4 mg/l

Chronic_{dry} = 1.24 mg/l

Chronic_{wet} = 2.32 mg/l

Wasteload Allocations:

Q_e = Design Flow of WWTP = 0.008 MGD

Q_s = Critical Flow (1Q10 for Acute, 30Q10 for Chronic Ammonia)

June-November

Q_{s-1d} = 1Q10 Flow = .0019 MGD

Q_{s-30d} = 30Q10 Flow = 0.334 MGD

December-May

Q_{s-1w} = 1Q10 High Flow = 0.105 MGD

Q_{s-30w} = 30Q10 High Flow = 2.302MGD

f = decimal fraction of flow to use (from mixing zone predictions-Attachment 1)

f_1 = 1.0 for acute (1Q10)

= 1.0 for chronic (30Q10)

Ammonia-Nitrogen Analysis for Hurley High School STP (continued)

The calculated water quality wasteload allocations (WQ-WLAs), assuming a background concentration of 0, are as follows:

Acute

$$WQ-WLA_{ad} = \text{acute dry WQ-WLA} = \frac{\{A_d[Q_{s-1d}(f) + Q_e] - Q_{s-1d}\text{background}\}}{Q_e}$$

$$WQ-WLA_{aw} = \text{acute wet WQ-WLA} = \frac{\{A_w[Q_{s-1w}(f) + Q_e] - Q_{s-1w}\text{background}\}}{Q_e}$$

Chronic

$$WQ-WLA_{cd} = \text{chronic dry WQ-WLA} = \frac{\{C_d[Q_{s-30d}(f) + Q_e] - Q_{s-30d}\text{background}\}}{Q_e}$$

$$WQ-WLA_{cw} = \text{chronic wet WQ-WLA} = \frac{\{C_w[Q_{s-30w}(f) + Q_e] - Q_{s-30w}\text{background}\}}{Q_e}$$

For 0.008 MGD:

$$WQ-WLA_{ad} = \frac{8.4[0.019(1.0) + 0.008]}{0.008} = 28.35 \text{ mg/l}$$

$$WQ-WLA_{aw} = \frac{8.4[0.105(1.0) + 0.008]}{0.008} = 118.65 \text{ mg/l}$$

$$WQ-WLA_{cd} = \frac{1.24[0.334(1.0) + 0.008]}{0.008} = 53.1 \text{ mg/l}$$

$$WQ-WLA_{cw} = \frac{2.32[2.302(1.0) + 0.008]}{0.008} = 669.9 \text{ mg/l}$$

Permit Limits:

The above WLA's were entered in the *Virginia DEQ: Statistically Derived Permit Limits Version 2.0.4* with the following results: (program output provided page 3 of this attachment)

(Jun-Nov): No Limit Needed

(Dec-May): No Limit Needed

Limit Derivation from *Statistically Derived Permit Limits Version 2.0.4*:

(Jun-Nov)

Chemical = Ammonia

Chronic averaging period = 30

$WLA_a = 28.35$

$WLA_c = 53.1$

$Q.L. = 0.2$

samples/mo = 1

samples/wk = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No limit is required for this material

The data are: 9

(Dec-May)

Chemical = Ammonia

Chronic averaging period = 30

$WLA_a = 118.65$

$WLA_c = 669.9$

$Q.L. = 0.2$

samples/mo = 1

samples/wk = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No limit is required for this material

The data are: 9